DEFENSE INFORMATION SYSTEMS AGENCY
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IN REPLY REFER TO: Joint Interoperability Test Command (JTE) **17 Apr 12**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Avaya S8300D with Gateway 450 (G450) Release Communications Manager (CM) 6.0 (R16x.00.1.510.1) with Service Pack 19211

References: (a) DoD Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (g), see Enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Avaya S8300D with G450 Release CM6.0 (R16x.00.1.510.1) with Service Pack 19211 is hereinafter referred to as the System Under Test (SUT). The SUT meets all of its critical interoperability requirements and is certified for joint use within the Defense Information System Network (DISN) for the following switch types: Private Branch Exchange (PBX) 1 and PBX 2. The SUT meets the Voice over Internet Protocol (VoIP) critical interoperability requirements with any certified Assured Services Local Area Network (ASLAN) or ASLAN components on the Unified Capabilities (UC) Approved Products List (APL). The identified test discrepancies shown in the Certification Testing Summary (Enclosure 2) have an overall minor operational impact. No other configurations, features, or functions, except those cited within this report, are certified by JITC. The SUT meets the critical interoperability requirements for a PBX 1 set forth in References (c) through (e), using test procedures derived from Reference (f). This certification expires upon changes that could affect interoperability, but no later than two years from the date the DISA Certifying Authority (CA) provided a positive Recommendation.

3. This finding is based on interoperability testing conducted by JITC, DISA adjudication of open test discrepancy reports (TDR), review of the vendor's Letters of Compliance (LoC), and a DISA CA positive recommendation. Interoperability testing of the SUT was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 25 July through 26 August 2011. DISA adjudication of outstanding TDRs was completed on 14 February 2012. Review of the vendor's LoC was completed on 07 September 2011. The DISA CA provided a positive recommendation on 10 April 2012 based on the security testing completed by DISA-led Information Assurance (IA) test teams and published in a separate

report, Reference (g). Enclosure 2 documents the test results and describes the tested network and system configurations.

4. Table 1 provides the SUT interoperability test summary. Table 2 provides the PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs). This interoperability test status is based on the SUT's ability to meet:

a. DISN services for Network and Applications specified in Reference (e).

b. PBX 1 interface and signaling requirements for trunks/lines specified in References (c) and (d) verified through JITC testing and/or vendor submission of LoC.

c. PBX 1 CRs/FRs specified in References (c) and (d) verified through JITC testing and/or vendor submission of LoC.

d. The overall system interoperability performance derived from test procedures listed in Reference (f).

Table 1. SUT Interoperability Test Summary

DISN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs.
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
DISN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog Loop Start (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all critical CRs and FRs.
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.
VoIP (Ethernet IEEE 802.3u)	No	Certified	Met all critical CRs and FRs.

Table 1. SUT Interoperability Test Summary (continued)

DISN Features and Capabilities				
Features and Capabilities		**Critical**	**Status**	**Remarks**
Common Features		Yes	Certified	Met all critical CRs and FRs with the following minor exception: A short "ping" ring is not provided on the VoIP phone 9641when all calls are forwarded[1]
Attendant		No	Certified	Met all critical CRs and FRs.
Public Safety		Yes	Certified	The SUT met all critical CRs and FRs for Basic 911.
Conferencing	Preset Conferencing	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
	Meet-Me Conferencing	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
	Progressive Conferencing	No	Certified	Met all critical CRs and FRs
Nailed-up Connections		No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
DISN Hotline Services		No	Certified	Met all critical CRs and FRs.
MLPP		Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the Loss of C2 announcement.[2]
Call Processing		Yes	Certified	Met all critical CRs and FRs.
ISDN Services		Yes	Certified	Met all critical CRs and FRs.
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs.
Security		Yes	Certified	Met all critical CRs and FRs.[3]
VoIP System		No	Certified	Met all critical CRs and FRs with following minor exception: All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred.[4]

Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is supported by the SUT, but was not tested and is not covered under this certification.
	2-Wire Analog Ground Start (GR-506-CORE)	No	Certified	Met all critical CRs and FRs.[5]

NOTES:

1 A short "ping" ring is not provided on the VoIP phone 9641when all calls are forwarded and the phone does not visually display that call forward variable is enabled. This was adjudicated by DISA on 14 February 2012 as having a minor operational impact with the intent to change this requirement in the next UCR version from required to conditional for a VoIP end instrument.

2 The SUT does not support the Loss of C2 announcement. This announcement is invoked only when a DISN subscriber is automatically routed to a non-MLPP network. DISA previously adjudicated this anomaly as having a minor operational impact with the intent to change this requirement to conditional for a PBX 1 because this announcement would rarely be invoked on a PBX 1.

3 Security is tested by DISA-led Information Assurance test teams and the results published in a separate report, Reference (g).

4 All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred. This was adjudicated by DISA as minor with the vendor's POAM to fix this anomaly by 9 August 2012.

5 This interface requirement was met by the vendor's LoC.

Table 1. SUT Interoperability Test Summary (continued)

LEGEND:

ANSI	American National Standards Institute	LoC	Letters of Compliance
BRI	Basic Rate Interface	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
C2	Command and Control		
CAS	Channel Associated Signaling	MFR1	Multi-Frequency Recommendation 1
CR	Capability Requirements	MLPP	Multi-Level Precedence and Preemption
DISA	Defense Information Systems Agency	NI 1/2	National ISDN Standard 1 or 2
DISN	Defense Information System Network	PBX 1	Private Branch Exchange 1
DP	Dial Pulse	POAM	Plan of Actions and Milestones
DTMF	Dual Tone Multi-Frequency	PRI	Primary Rate Interface
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.931	Signaling Standard for ISDN
FR	Feature Requirements	Q.955.3	ISDN Signaling standard for E1 MLPP
GR	Generic Requirement	SUT	System Under Test
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1	Digital Transmission Link Level 1 (1.544 Mbps)
IEEE	Institute of Electrical and Electronics Engineers	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
IP	Internet Protocol		
IPv6	Internet Protocol version 6	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
ISDN	Integrated Services Digital Network	UC	Unified Capabilities
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	UCR	Unified Capabilities Requirements
		VoIP	Voice over Internet Protocol

Table 2. PBX 1 CR and FR Requirements

DISN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Trunking	• PBX Line (C) • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R) • ISDN ANSI MLPP Service Capability (R) • ITU-T ISDN Primary Access (Europe only) (C) • ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C) • Normal Wink Start Operations (R) • Glare Operation (R) • Abnormal Wink Start (R) • Glare Resolution (R) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (R) • Disconnect Control (R) • Reselect and Retrial (R) • Off-Hook Supervision Transition (R) • Dial-Pulse Signals (R) • DTMF Signaling (R) • Standard Digit Format for Precedence (C) • MFR1 2/6 Signaling (C) • Alerting Signals and Tones (R) • DISN ISDN User-to-Network Signaling (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DISN User-to-Network Signaling (R) • DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DISN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (R) • Clear Channel Capability (R) • Alarm and Restoral Requirements (R) • PCM-30 Digital Trunk Interface (Europe only) (R) • Interoperation of PCM-24 and PCM-30 (R) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Trunk Group-Remove from Service (R) • Trunk Group-Restore to Service (R)	• UCR Section 5.2.1.3.1 • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.1.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.1.3.4.2.1 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2.1 • UCR Section 5..2.4.3.3.2.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.3.4.7 • UCR Section 5.2.3.4.8 • UCR Section 5..2.3.4.9 • UCR Section 5.2.3.4.10 • UCR Section 5..2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5..2.4.4.2.1 • UCR Section 5.2.4.4.3 • UCR Section 5..2.4.5.1 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5..2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5..2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5 • UCR Section 5.2.1.5.5 • UCR Section 5.2.1.5.5

Table 2. PBX 1 CR and FR Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP)	No	Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Data	• Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes			
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog	Yes	Access	• Directory Number Identification (R) • Analog Line (R) • National ISDN 1/2 Basic Access (R: BRI Only) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R: 2-WireAnalog only) • Alerting Signals and Tones (R) • S/T Reference Point (R: ISDN BRI only) • VoIP System Requirements (R: VoIP Phones only)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.3.5 • UCR Section 5.2.1.3.3 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.5.1 • UCR Section 5.2.4.7.1.2.1 • UCR Section 5.2.12.8
ISDN BRI NI 1/2 (ANSI T1.619a)	No			
2-Wire Proprietary Digital	No			
VoIP (Ethernet IEEE 802.3u)	No	Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R: 2-Wire Analog only) • Secure data (STE/STU-III) (R: 2-Wire Analog only)	• CJCSI 6215.01C • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DISN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes	• Individual Lines (R) • Denied originating service (C) • Code restriction and diversion (R) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call Forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • UCR Section 5.2.1.1.5.1 • UCR Section 5.2.1.1.6 • UCR Section 5.2.1.1.7 • UCR Section 5.2.1.1.7.1 • UCR Section 5.2.1.1.7.2 • UCR Section 5.2.1.1.7.3 • UCR Section 5.2.1.1.7.4 • UCR Section 5.2.1.1.7.5 • UCR Section 5.2.1.1.7.6 • UCR Section 5.2.1.1.7.7 • UCR Section 5.2.1.1.7.8 • UCR Section 5.2.1.1.8.1 • UCR Section 5.2.1.1.8.2 • UCR Section 5.2.1.1.8.3 • UCR Section 5.2.1.1.8.4 • UCR Section 5.2.1.1.9.1 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9	
Attendant	No	• Attendant Features (C)		• UCR Section 5.2.1.2.2

Table 2. PBX 1 CR and FR Requirements (continued)

DISN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Public Safety	Yes	• Emergency Service Basic (911) Caller (R) • Emergency Service (911) Public Safety Answering Service (C) • Enhanced Emergency Service (E911) (C) • Trace of terminating calls (R) • Outgoing call trace (R)	• UCR Section 5.2.1.4.1.1 • UCR Section 5.2.1.4.1.2 • UCR Section 5.2.1.4.1.3 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3
Conferencing	No	• Preset Conferencing (C) • Meet-Me Conferencing (C) • Progressive Conferencing (C)	• UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3
Nailed-up Connections	No	• Nailed-Up Connections (C)	• UCR Section 5.2.1.8
DISN Hotline Services	No	• DISN Analog Hotline Service (C)	• UCR Section 5.2.1.12
MLPP	Yes	• MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • Precedence Call Diversion (R) • CAS (R) • PRI (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface (R) • ISDN PRI (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C)	• UCR Section 5.2.2.1.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.1 • UCR Section 5.2.2.2.2 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4.1 • UCR Section 5.2.2.4.2 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.7 • UCR Section 5.2.2.8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7.1 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.10.1

Table 2. PBX 1 CR and FR Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (R) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DISN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DISN Switch Outpulsing Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (R) • Digit Reception Requirements (R) • Screening (R)	• UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.1 • UCR Section 5.3.3.5.2.1 • UCR Section 5.2.3.5.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1..4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.8
ISDN Services	Yes	• BRI Access, Call Control and Signaling (R) • Uniform Interface Configuration for BRIs (R) • EKTS (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section 5.2.9.2, Table 5.2.9-1 • UCR Section 5.2.9.2, Table 5.2.9-2 • UCR Section 5.2.9.3, Table 5.2.9-3 • UCR Section 5.2.9.2, Table 5.2.9-4 • UCR Section 5.2.9.2, Table 5.2.9-5 • UCR Section 5.2.9.2, Table 5.2.9-6
Synchronization	Yes	• Line timing mode (R) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C)	• UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability	Yes	• System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 5.2.11.2 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 3

Table 2. PBX 1 CR and FR Requirements (continued)

VoIP			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
VoIP System[1]	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • Softphone Requirements (C)	• UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR 2008, Change 2, section 5.3.5.4 • UCR section 5.2.12.8.2.9 • UCR 2008, section 5.3.12.8.3.1
Network Gateways			
Gateway	**Critical**	**Requirements Required or Conditional**	**References**
PSTN[2]	No	Trunking • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4

NOTES:
1 All requirements are derived from the UCR 2008, Reference (c) with the exception of the IPv6 requirements because UCR 2008 defines the Legacy PBX 1 requirements which are not found in subsequent UCR updates. However, the latest IPv6 DoD profile requirements for a NA/SS, which are applicable to the SUT, have been updated in UCR 2008 Change 2 Reference (d).
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.

Table 2. PBX 1 CR and FR Requirements (continued)

LEGEND:

802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FTR 1080B-2002	Video Teleconferencing Services	PCM-24	Pulse Code Modulation - 24 Channels
ANSI	American National Standards Institute	G.711	PCM of voice frequencies	PCM-30	Pulse Code Modulation - 30 Channels
BER	Bit Error Ratio	GR	Generic Requirement	PRI	Primary Rate Interface
BRI	Basic Rate Interface	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PSTN	Public Switched Telephone Network
C	Conditional	H.320	Standard for Narrowband VTC	Q.955.3	ISDN Signaling Standard for E1 MLPP
CAS	Channel Associated Signaling	IEEE	Institute of Electrical and Electronics Engineers	R	Required
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IP	Internet Protocol	S/T	ISDN BRI four-wire interface
CODEC	Coder/Decoder	IPv6	Internet Protocol version 6	STE	Secure Terminal Equipment
CR	Capability Requirement	ISDN	Integrated Services Digital Network	STIG	Security Technical Implementation Guides
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	STU-III	Secure Telephone Unit -3rd generation
DISR	DoD IT Standards Registry	ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	T.4	Standardization of Group 3 facsimile terminals for document transmission
DoD	Department of Defense	MFR1	Multi-Frequency Recommendation 1	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DoDI	Department of Defense Instruction	MLPP	Multi-Level Precedence and Preemption	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DP	Dial Pulse	MOS	Mean Opinion Score	UCR	Unified Capabilities Requirements
DS0	Digital Signal Level 0 (64 kbps)	NX56	Data format restricted to multiples of 56 kbps	UPS	Uninterruptible Power Supply
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	NX64	Data format restricted to multiples of 64 kbps	VBD	Variable bit data
DISN	Defense Switched Network	PBX	Private Branch Exchange	VoIP	Voice over Internet Protocol
DTMF	Dual Tone Multi-Frequency	PBX 1	Private Branch Exchange 1	VTC	Video Teleconferencing
E&M	Ear and Mouth	PCM	Pulse Code Modulation		
E1	European Basic Multiplex Rate (2.048 Mbps)				
EKTS	Electronic Key Telephone System				
FR	Functional Requirement				
FTR	Federal Telecommunications Recommendation				

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DISN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

6. The JITC point of contact is Capt Stéphane Arsenault, commercial (520) 538-5269, FAX DISN 879-4347, or e-mail to Stephane.arsenault@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 1032101.

FOR THE COMMANDER:

2 Enclosures a/s

for BRADLEY A. CLARK
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):
Joint Staff J-6
Joint Interoperability Test Command, Liaison, TE3/JT1
Office of Chief of Naval Operations, CNO N6F2
Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)
Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ
U.S. Marine Corps MARCORSYSCOM, SIAT, MJI Division I
DOT&E, Net-Centric Systems and Naval Warfare
U.S. Coast Guard, CG-64
Defense Intelligence Agency
National Security Agency, DT
Defense Information Systems Agency, TEMC
Office of Assistant Secretary of Defense (NII)/DOD CIO
U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009
(d) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008 Change 2," 31 December 2010
(e) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
(f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006
(g) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Avaya S8300D with Gateway 450 (G450) Release CM6.0 (R16x.00.1.510.1) with Service Pack 19211 (Tracking Number 1032101)," Draft

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Avaya S8300D with Gateway 450 (G450) Release Communications Manager (CM) 6.0 (R16x.00.1.510.1) with Service Pack 19211; hereinafter referred to as the System Under Test (SUT).

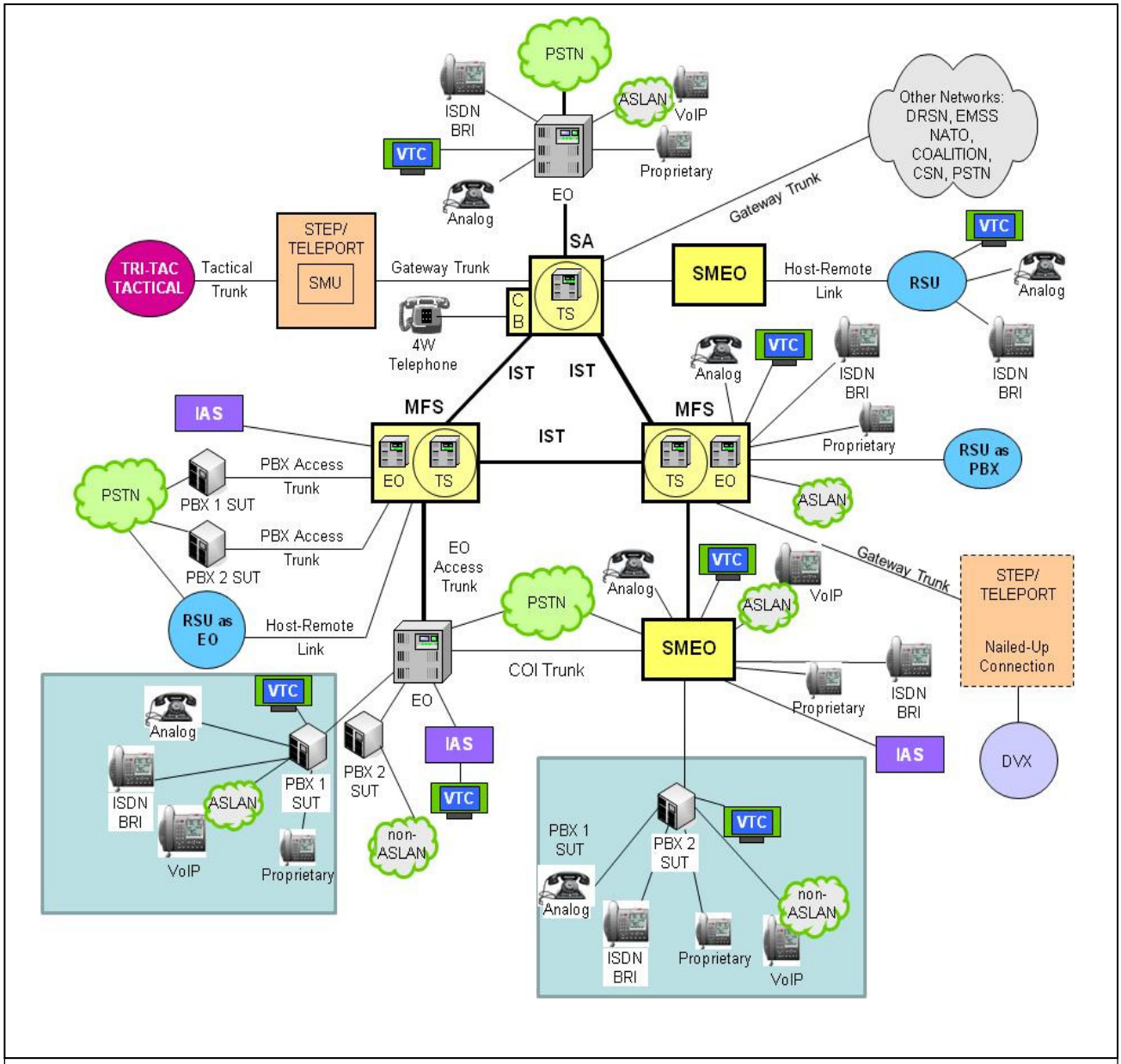
2. SPONSOR. Navy Shore Telephony APM.

3. SYSTEM POC. Shirley Dolengo, PEO C4I PMW 790, 430 Pacific Highway, San Diego, CA 92110, e-mail: shirely.dolengo@navy.mil.

4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SUT DESCRIPTION. The SUT is a Private Branch Exchange (PBX) 1. The SUT Media Server is a 19" rack-mounted, Pentium processor based unit with 512MB of Random Access Memory running the Red Hat Linux 5.5 operating system and occupies a single slot on a G450. The SUT Media Server provides a Voice over Internet Protocol (VoIP)-based integrated voice mail messaging capability for up to 450 light duty users. The SUT media Local Area Network (LAN) passes both voice and data traffic whereas the management LAN is used solely for management purposes. Each SUT G450 gateway can support up to 8 Digital Transmission Link Level 1 (T1)/European Basic Multiplex Rate (E1) interfaces. Each SUT G450 gateway can support IP, analog, digital, and Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) lines in any combination as long as the total doesn't exceed the maximum capacity. The capacities include: 8 media module slots, maximum of 450 IP lines, 192 digital/analog lines, 128 BRI lines. The SUT supports a maximum of 50 G450 gateways. The SUT also provides an internal Automated Call Distribution system which is certified for joint use.

6. OPERATIONAL ARCHITECTURE. The Defense Information System Network (DISN) architecture is a two-level network hierarchy consisting of DISN backbone switches and Service/Agency installation switches. Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DISN architecture; therefore, consists of several categories of switches including PBXs. The Unified Capabilities Requirements (UCR) operational DISN Architecture is depicted in Figure 2-1. The architecture depicts the relationship of Military Department PBX 1s to the other DISN switch types.



LEGEND:

4W	4-Wire
ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CB	Channel Bank
COI	Community of Interest
CSN	Canadian Switch Network
DRSN	Defense Red Switch Network
DISN	Defense Information System Network
DVX	Deployable Voice Exchange
EMSS	Enhanced Mobile Satellite System
EO	End Office
IAS	Integrated Access Switch
ISDN	Integrated Services Digital Network
IST	Interswitch Trunk
MFS	Multifunction Switch
NATO	North Atlantic Treaty Organization
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange 1
PBX 2	Private Branch Exchange 2
PSTN	Public Switched Telephone Network
RSU	Remote Switching Unit
SA	Standalone
SMEO	Small End Office
SMU	Switched Multiplex Unit
STEP	Standardized Tactical Entry Point
Tri-Tac	Tri-Service Tactical Communications Program
TS	Tandem Switch
VoIP	Voice over Internet Protocol
VTC	Video Teleconferencing

Figure 2-1. DISN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX 1s are listed in Table 2-1. These requirements are derived from:

a. DISN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, “Policy for Department of Defense Voice Services with Real Time Services (RTS)”, Reference (d).

b. UCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of LoC, References (e) and (f).

c. UCR PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC, References (e) and (f).

Table 2-1. PBX 1 Requirements

DISN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Trunking	• PBX Line (C) • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R) • ISDN ANSI MLPP Service Capability (R) • ITU-T ISDN Primary Access (Europe only) (C) • ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C) • Normal Wink Start Operations (R) • Glare Operation (R) • Abnormal Wink Start (R) • Glare Resolution (R) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (R) • Disconnect Control (R) • Reselect and Retrial (R) • Off-Hook Supervision Transition (R) • Dial-Pulse Signals (R) • DTMF Signaling (R) • Standard Digit Format for Precedence (C) • MFR1 2/6 Signaling (C) • Alerting Signals and Tones (R) • DISN ISDN User-to-Network Signaling (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DISN User-to-Network Signaling (R) • DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DISN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (R) • Clear Channel Capability (R) • Alarm and Restoral Requirements (R) • PCM-30 Digital Trunk Interface (Europe only) (R) • Interoperation of PCM-24 and PCM-30 (R) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Trunk Group-Remove from Service (R) • Trunk Group-Restore to Service (R)	• UCR Section 5.2.1.3.1 • UCR Section 5.2.1.3.2 • UCR Section 5.2.1.3.4.1 • UCR Section 5.2.1.3.4.1.1 • UCR Section 5.2.1.3.4.2 • UCR Section 5.2.1.3.4.2.1 • UCR Section 5.2.4.3.3.1.1 • UCR Section 5.2.4.3.3.1.2 • UCR Section 5.2.4.3.3.2.1 • UCR Section 5..2.4.3.3.2.2 • UCR Section 5.2.4.3.5 • UCR Section 5.2.4.3.6 • UCR Section 5.2.3.4.7 • UCR Section 5.2.3.4.8 • UCR Section 5..2.3.4.9 • UCR Section 5.2.3.4.10 • UCR Section 5..2.4.4.1 • UCR Section 5.2.4.4.2 • UCR Section 5..2.4.4.2.1 • UCR Section 5.2.4.4.3 • UCR Section 5..2.4.5.1 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5..2.4.7.1.1 • UCR Section 5.2.4.7.1.2 • UCR Section 5.2.4.7.1.3 • UCR Section 5..2.4.7.1.3.1 • UCR Section 5.2.4.7.1.3.2 • UCR Section 5.2.4.7.1.4 • UCR Section 5.2.4.7.1.4.2 • UCR Section 5.2.4.7.1.4.3 • UCR Section 5.2.4.7.1.4.4 • UCR Section 5.2.4.7.1.4.5 • UCR Section 5.2.4.7.1.4.6 • UCR Section 5.2.6.1 • UCR Section 5.2.6.1.1 • UCR Section 5.2.6.1.2 • UCR Section 5.2.6.1.3 • UCR Section 5.2.6.1.4 • UCR Section 5.2.6.2 • UCR Section 5.2.6.3 • UCR Section 5.2.6.4 • UCR Section 5.2.6.5 • UCR Section 5.2.1.5.5 • UCR Section 5.2.1.5.5

Table 2-1. PBX 1 Requirements (continued)

DISN Trunk Interfaces (continued)				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP)	No	Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Facsimile	• Analog: ITU-T T.4 (R)	• DISR
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Data	• Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • UCR Section 5.2.2.9.6 • CJCSI 6215.01C
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DISN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a) 2-Wire Proprietary Digital	Yes No No	Access	• Directory Number Identification (R) • Analog Line (R) • National ISDN 1/2 Basic Access (R: BRI Only) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R: 2-WireAnalog only) • Alerting Signals and Tones (R) • S/T Reference Point (R: ISDN BRI only) • VoIP System Requirements (R: VoIP Phones only)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.3.5 • UCR Section 5.2.1.3.3 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.1.5.4.1.1 • UCR Section 5.2.4.2.1 • UCR Section 5.2.4.3.1 • UCR Section 5.2.4.5.1 • UCR Section 5.2.4.7.1.2.1 • UCR Section 5.2.12.8
VoIP (Ethernet IEEE 802.3u)	No	Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R: 2-Wire Analog only) • Secure data (STE/STU-III) (R: 2-Wire Analog only)	• CJCSI 6215.01C • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DISN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes		• Individual Lines (R) • Denied originating service (C) • Code restriction and diversion (R) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call Forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (R)	• UCR Section 5.2.1.1.1 • UCR Section 5.2.1.1.3 • UCR Section 5.2.1.1.4 • UCR Section 5.2.1.1.5.1 • UCR Section 5.2.1.1.6 • UCR Section 5.2.1.1.7 • UCR Section 5.2.1.1.7.1 • UCR Section 5.2.1.1.7.2 • UCR Section 5.2.1.1.7.3 • UCR Section 5.2.1.1.7.4 • UCR Section 5.2.1.1.7.5 • UCR Section 5.2.1.1.7.6 • UCR Section 5.2.1.1.7.7 • UCR Section 5.2.1.1.7.8 • UCR Section 5.2.1.1.8.1 • UCR Section 5.2.1.1.8.2 • UCR Section 5.2.1.1.8.3 • UCR Section 5.2.1.1.8.4 • UCR Section 5.2.1.1.9.1 • UCR Section 5.2.1.7 • UCR Section 5.2.1.9
Attendant	No	• Attendant Features (C)		• UCR Section 5.2.1.2.2

Table 2-1. PBX 1 Requirements (continued)

DISN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Public Safety	Yes	• Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Service (C) • Enhanced Emergency Service (E911) (C) • Trace of terminating calls (R) • Outgoing call trace (R)	• UCR Section 5.2.1.4.1.1 • UCR Section 5.2.1.4.1.2 • UCR Section 5.2.1.4.1.3 • UCR Section 5.2.1.4.2 • UCR Section 5.2.1.4.3
Conferencing	No	• Preset Conferencing (C) • Meet-Me Conferencing (C) • Progressive Conferencing (C)	• UCR Section 5.2.1.6.1 • UCR Section 5.2.1.6.2 • UCR Section 5.2.1.6.3
Nailed-up Connections	No	• Nailed-Up Connections (C)	• UCR Section 5.2.1.8
DISN Hotline Services	No	• DISN Analog Hotline Service (C)	• UCR Section 5.2.1.12
MLPP	Yes	• MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • Precedence Call Diversion (R) • CAS (R) • PRI (R) • Analog Line MLPP (R) • ISDN MLPP BRI (R) • ISDN PRI (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C)	• UCR Section 5.2.2.1.1 • UCR Section 5.2.2.2 • UCR Section 5.2.2.2.1 • UCR Section 5.2.2.2.2 • UCR Section 5.2.2.3 • UCR Section 5.2.2.4.1 • UCR Section 5.2.2.4.2 • UCR Section 5.2.2.5 • UCR Section 5.2.2.6 • UCR Section 5.2.2.7 • UCR Section 5.2.2.8.1 • UCR Section 5.2.2.8.2 • UCR Section 5.2.2.8.3 • UCR Section 5.2.2.8.4 • UCR Section 5.2.2.8.5 • UCR Section 5.2.2.8.6 • UCR Section 5.2.2.8.7.1 • UCR Section 5.2.2.8.8 • UCR Section 5.2.2.8.9 • UCR Section 5.2.2.10.1

Table 2-1. PBX 1 Requirements (continued)

DISN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (R) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DISN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DISN Switch Outpulsing Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (R) • Digit Reception Requirements (R) • Screening (R)	• UCR Section 5.2.3.1 • UCR Section 5.2.3.2 • UCR Section 5.2.3.3.1 • UCR Section 5.2.3.3.2 • UCR Section 5.2.3.3.3 • UCR Section 5.2.3.3.4 • UCR Section 5.2.3.5.1.1 • UCR Section 5.2.3.5.1.1 • UCR Section 5.3.3.5.2.1 • UCR Section 5.2.3.5.2.2 • UCR Section 5.2.3.5.1.3 • UCR Section 5.2.3.5.1.3.1 • UCR Section 5.2.3.5.1.3.2 • UCR Section 5.2.3.5.1.3.3 • UCR Section 5.2.3.5.1..4 • UCR Section 5.2.3.5.1.5 • UCR Section 5.2.3.5.1.6 • UCR Section 5.2.3.5.1.7 • UCR Section 5.2.3.5.1.8.1 • UCR Section 5.2.3.5.1.8.2 • UCR Section 5.2.3.5.1.9 • UCR Section 5.2.3.5.2 • UCR Section 5.2.3.5.3 • UCR Section 5.2.3.5.4 • UCR Section 5.2.3.5.5 • UCR Section 5.2.3.5.6 • UCR Section 5.2.3.5.8
ISDN Services	Yes	• BRI Access, Call Control and Signaling (R) • Uniform Interface Configuration for BRIs (R) • EKTS (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section 5.2.9.2, Table 5.2.9-1 • UCR Section 5.2.9.2, Table 5.2.9-2 • UCR Section 5.2.9.3, Table 5.2.9-3 • UCR Section 5.2.9.2, Table 5.2.9-4 • UCR Section 5.2.9.2, Table 5.2.9-5 • UCR Section 5.2.9.2, Table 5.2.9-6
Synchronization	Yes	• Line timing mode (R) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C)	• UCR Section 5.2.10.1.1.2 • UCR Section 5.2.10.1.1.2.2 • UCR Section 5.2.10.2 • UCR Section 5.2.10.3 • UCR Section 5.2.10.4
Reliability	Yes	• System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 5.2.11.2 • UCR Section 5.2.11.3 • UCR Section 5.2.11.3.1 • UCR Section 5.2.11.3.2 • UCR Section 5.2.11.3.2.1 • UCR Section 5.2.11.3.3 • UCR Section 5.2.11.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 3

Table 2-1. PBX 1 Requirements (continued)

VoIP			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
VoIP System[1]	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • Softphone Requirements (C)	• UCR section 5.2.12.8.2.1 • UCR section 5.2.12.8.2.2 • UCR section 5.2.12.8.2.3 • UCR section 5.2.12.8.2.4 • UCR section 5.2.12.8.2.5 • UCR section 5.2.12.8.2.6 • UCR section 5.2.12.8.2.7 • UCR 2008, Change 2, section 5.3.5.4 • UCR section 5.2.12.8.2.9 • UCR 2008, section 5.3. UCR 2008, section 5.3.12.8.3.1

Network Gateways				
Gateway	**Critical**	**Requirements Required or Conditional**		**References**
PSTN[2]	No	Trunking	• Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.4.2.2 • UCR Section 5.2.4.3.2 • UCR Section 5.2.4.3.4

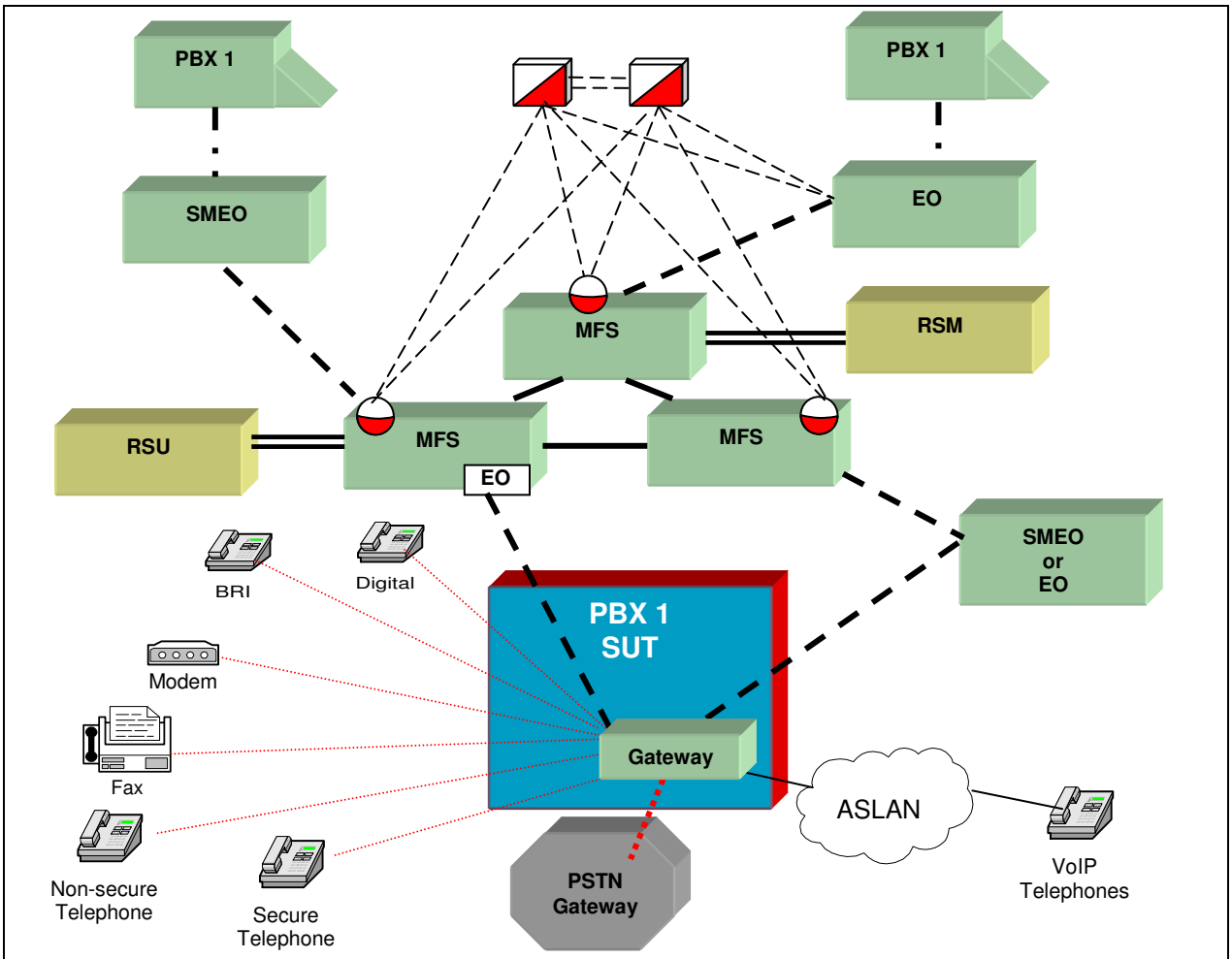
NOTES:
1 All requirements are derived from the UCR 2008, Reference (c) with the exception of the IPv6 requirements because UCR 2008 defines the Legacy PBX 1 requirements which are not found in subsequent UCR updates. However, the latest IPv6 DoD profile requirements for a NA/SS, which are applicable to the SUT, have been updated in UCR 2008 Change 2 Reference (d).
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.

Table 2-1. PBX 1 Requirements (continued)

LEGEND:

802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FTR	Federal Telecommunications Recommendation	PCM-30	Pulse Code Modulation - 30 Channels
ANSI	American National Standards Institute	G.711	PCM of voice frequencies	PRI	Primary Rate Interface
BER	Bit Error Ratio	GR	Generic Requirement	PSTN	Public Switched Telephone Network
BRI	Basic Rate Interface	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	Q.955.3	ISDN Signaling Standard for E1 MLPP
C	Conditional	IEEE	Institute of Electrical and Electronics Engineers	R	Required
CAS	Channel Associated Signaling	IP	Internet Protocol	S/T	ISDN BRI four-wire interface
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IPv6	Internet Protocol version 6	SS7	Signaling System 7
CODEC	Coder/Decoder	ISDN	Integrated Services Digital Network	STE	Secure Terminal Equipment
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	STIG	Security Technical Implementation Guide
DISN	Defense Information System Network	ITU-T	International Telecommunication Union- Telecommunication Standardization Sector	STU-III	Secure Telephone Unit - 3rd generation
DISR	DoD IT Standards Registry	kbps	kilobits per second	SUT	System Under Test
DoD	Department of Defense	Mbps	Megabits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission
DoDI	Department of Defense Instruction	MFR1	Multi-Frequency Recommendation 1	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DP	Dial Pulse	MLPP	Multi-Level Precedence and Preemption	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DS0	Digital Signal Level 0 (64 kbps)	MOS	Mean Opinion Score	TDM	Time Division Multiplexing
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	NI 1/2	National ISDN Standard 1 or 2	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	NX56	Data format restricted to multiples of 56 kbps	UPS	Uninterruptible Power Supply
E&M	Ear and Mouth	NX64	Data format restricted to multiples of 64 kbps	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	PBX	Private Branch Exchange	VoIP	Voice over Internet Protocol
EKTS	Electronic Key Telephone System	PBX 1	Private Branch Exchange 1	VTC	Video Teleconferencing
		PCM	Pulse Code Modulation		
		PCM-24	Pulse Code Modulation - 24 Channels		

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DISN operational environment. Testing of the system's required functions and features was conducted using the SUT notional test configuration depicted in Figure 2-2. The SUT test configuration with an Assured Services Local Area Network (ASLAN) is depicted in Figure 2-3. The SUT was tested as the end-point in relation to the other switches.

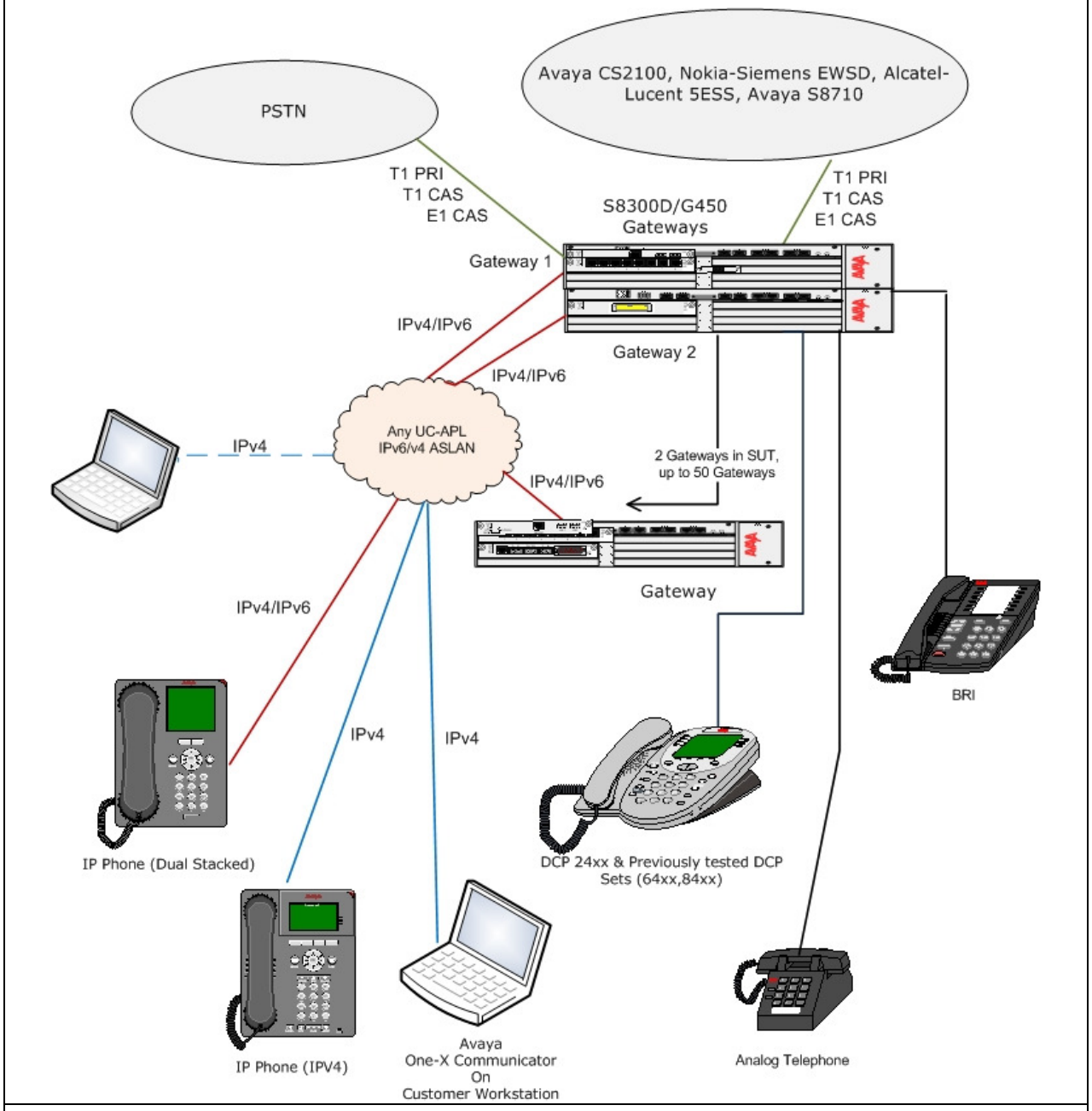


LEGEND:

ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CAS	Channel Associated Signaling
DISN	Defense Switched Network
E1	European Basic Multiplex Rate (2.048 Mbps)
EO	End Office
FAX	facsimile
ISDN	Integrated Services Digital Network
Mbps	Megabits per second
MFS	Multifunction Switch
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange Type 1
PRI	Primary Rate Interface
PSTN	Public Switched Telephone Network
RSM	Removable Storage Manager
RSU	Remote Switching Unit
SMEO	Small End Office
SS7	Signaling System 7
SSP	Service Switching Point
STP	Signal Transfer Point
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
TCP/IP	Transmission Control Protocol/Internet Protocol
VoIP	Voice over Internet Protocol

- SS7 SSP
- SS7 STP
- PSTN Gateway Trunk (T1/E1 ISDN PRI)
- DISN Interswitch Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- DISN Line (2 Wire Analog)
- SS7 Links (A-Link, B-Link, or C-Link)
- TCP/IP
- DISN End Office Access Trunk (T1/E1 ISDN PRI)
- DISN PBX Access Trunk (T1/E1 ISDN PRI)
- RSU-Host Umbilical Link

Figure 2-2. SUT Notional Test Configuration



NOTE: The SUT is certified with any ASLAN or combination of certified ASLAN components listed on the Unified Capabilities Approved Products List.

LEGEND:

ASLAN	Assured Services Local Area Network	IPv4	Internet Protocol version 4
CAS	Channel Associated Signaling	IPv6	Internet Protocol version 6
DCP	Digital Communications Protocol	PRI	Primary Rate Interface
DISN	Defense Information System Network	PSTN	Public Switched Telephone Network
E1	European Basic Multiplex Rate (2.048 Mbps)	SUT	System Under Test
G450	Gateway 450	T1	Digital Transmission Link Level 1 (1.544 Mbps)
IP	Internet Protocol		

Figure 2-3. SUT Test Configuration with ASLAN

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DISN switches noted in Table 2-2. Table 2-2 lists the DISN switches which depict the tested configuration and is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the Unified Capabilities (UC) Approved Products List (APL) that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release
Nortel CS2100	SE 09.1
Siemens EWSD	19d with Patch Set 46
Alcatel-Lucent 5ESS	5E16.2 Broadcast Warning Message (BWM) 10-0001
Avaya S8710	Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)

System Name		Hardware/Software Release			
	Release	Hardware	Card Name Part Number/ Name	Software/Firmware	
SUT	CM6.0(R16x.00.1 .510.1) with Service Pack 19211	Management Workstation	Windows XP SP3	ASA 6.0	6.0.07
				Symantec Anti-Virus	15.5.0.23
		Primary (S8300D) w/G450 VxWorks 6.8 FW31.17.2	S8300D ICC/LSP Processor	Firmware C V2	
				Communications Manager 4.0.2-732	
				Red Hat Linux Enterprise Server 5.5	4-2.6.11
				Apache Web Server	2.2.3
			MM711 Analog Media Module	VH 27	
			MM710/ E1/T1 Media Module	VH 11	
			MM710B E1/T1 Media Module	VH 11	
			MM720 BRI Media Module	VH 7	
			MM721 BRI Media Module (See note.)	VH 7	
			MM717 DCP Media Module	VH 27	
			MM716 Analog Media Module	VH 27	
			MM712 DCP Media Module	VH 27	
		Secondary (S8300D) w/G450 VxWorks 6.8 FW31.17.2	S8300D ICC/LSP Processor	Firmware C V2	
				Communications Manager 4.0.2-732	
				Red Hat Linux Enterprise Server 5.5	4-2.6.11
				Apache Web Server	2.2.3
			MM710B/ E1/T1 Media Module	V 11	
			MM712 DCP Media Module	V 27	
			MM716 Analog Media Module	V 27	
			MM717 DCP Media Module	V 27	

Table 2-2. Tested System Configurations (continued)

SUT Telephone Instruments		
Telephone type	**Model (s)**	**Software/Firmware**
ISDN BRI	Avaya 8510T	NA
ISDN BRI	8810U and 8810T	Release 02.07.22
Digital Proprietary	6402D, 2420, 6408D, 6416D+M, 6402	NA
IP	9608	S9608_11HALBR6_0_20Sr03_V452
IP	9611	S9608_11HALBR6_0_20Sr03_V452
IP	9620 (IPv4 only)	Ha 96XXr3_171bs.bin
IP	9621	S9621_41HALBR6_0_20Sr03_V452
IP	9641	S9621_41HALBR6_0_20Sr03_V452
Secure Devices		
DSCD	L3 STE	2.7
DSCD	GD Viper PSTN	2.12
DSCD	GD Sectera Wire Line Terminal	12.05

NOTE: The MM720 was tested; however, it is an End of Life Product. The MM721, which has been designated by Avaya as the replacement, has similar hardware and the same firmware. JITC analysis determined it to be functionally identical for interoperability certification purposes.

LEGEND:

5ESS	Class 5 Electronic Switching System	IP	Internet Protocol
BRI	Basic Rate Interface	Ipv4	Internet Protocol version 4
BWM	Broadcast Warning Message	IPv6	Internet Protocol version 6
CM	Communication Manager	ISDN	Integrated Services Digital Network
DSCD	DoD Secure Communications Devices	Mbps	Megabits per second
DSS1	Digital Subscriber Signaling 1	PSTN	Public Switched Telephone Network
E1	European Basic Multiplex Rate (2.048 Mbps)	SE	Succession Enterprise
EWSD	Elektronisches Wählsystem Digital	STE	Secure Terminal Equipment
Fax	facsimile	SUT	System Under Test
		T1	Digital Transmission Link Level 1 (1.544 Mbps)

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DISN Trunk Interfaces. The SUT met all critical CRs and FRs for the T1 ISDN Primary Rate Interface (PRI) National ISDN Standard 1 or 2 (NI 1/2) (American National Standards Institute (ANSI) T1.619a), T1 Channel Associated Signaling (CAS), and E1 CAS interfaces. The SUT offers E1 ISDN PRI; however it does not support International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) Q.955.3 and is not certified for joint use in the DISN.

(2) DISN Line Interfaces. The SUT met all critical interoperability certification requirements for 2-Wire Loop Start Analog (GR-506-CORE), 2-Wire Proprietary Digital, ISDN BRI, and VoIP DISN line interfaces with the following minor exception: All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred. This was adjudicated by DISA as minor with the vendor's POAM to fix this anomaly by 9 August 2012.

(3) Features and Capabilities

(a) Common Features. The SUT met all critical interoperability certification requirements for Features and Capabilities.

(b) Public Safety. The SUT meets the minimum critical interoperability requirements for Public Safety which is basic emergency service 911 service. This feature allows the user to dial 911 and the SUT then retranslates it to be routed to a Public Safety Answering Point via a trunk or line. The following public safety features are not supported and; therefore, are not covered in this certification: Trace of terminating calls, Outgoing call trace, Tandem call trace, and Trace of a call in progress. These public safety features are not required for a PBX 1.

(c) Conferencing. The SUT met all CRs and FRs for progressive conferencing. The SUT does not support preset or meet-me conferencing. These features are not required for a PBX 1.

(d) Nailed-up Connections. This feature is not supported by the SUT and is not required for a PBX 1.

(e) Multi-Level Precedence and Preemption (MLPP). Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the Loss of Command and Control (C2) announcement. This announcement is invoked only when a DISN subscriber is automatically routed to a non-MLPP network. This anomaly was previously adjudicated as minor because this announcement would rarely be invoked on a PBX 1.

(f) Call Processing. Met all critical CRs and FRs.

(g) ISDN Services. Met all critical CRs and FRs for the T1 PRI interface.

(h) Synchronization. All critical interoperability certification CRs and FRs were met for this feature by the SUT. The SUT supports line timing mode and Internal Stratum 4 for synchronization.

(i) Reliability. All critical interoperability certification CRs and FRs for this feature were met by the SUT and by vendor LoC.

(j) Security. Security is tested by DISA-led Information Assurance (IA) test teams and published in a separate report, Reference (g).

(4) Network Gateways. The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network (PSTN) Gateway. The interfaces certified for the PSTN are T1 ISDN PRI NI 1/2 (ANSI T1.607), T1 CAS, E1 CAS, and 2-Wire Analog Ground Start Line (GR-506 CORE). The SUT offers E1 ISDN PRI (ITU-T Q.931); however, it was not tested and not covered under this certification.

(5) VoIP. The SUT is certified with any ASLAN or any combination of certified ASLAN components listed on the UC APL.

(a) VoIP System. The UCR, paragraph 5.2.12.8.2, outlines the requirements for the VoIP system. The VoIP system requirements encompass end-to-end (E2E) VoIP requirements. The following paragraphs detail the results of the SUT VoIP solution:

1. Voice Quality. In accordance with UCR, paragraph 5.2.12.8.2.1, VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured in accordance with ITU-T P.800 voice quality standards. This applies from handset to handset and for intra- and inter-switch calls E2E. The SUT met MOS requirements with both IPv4 and IPv6 preferred settings with an average of 4.35 for 12 test calls with a total test duration of 13 hours and 40 minutes. The SUT met this requirement with all VoIP phones and Legacy Time Division Multiplexing (TDM) phones.

2. Codec. In accordance with UCR, paragraph 5.2.12.8.2.2, the ITU-T G.711 Pulse Code Modulation Codec with a 20 milliseconds (ms) packet fill was required and was met by the SUT VoIP solution.

3. MLPP. In accordance with UCR, paragraph 5.2.12.8.2.3, the VoIP system shall meet all MLPP requirements identified in UCR, Section 3. All critical MLPP features and functions were met. Additionally, the SUT offers an internal Automatic Call Distribution System (ACD) that met the requirements in accordance with UCR paragraph 5.2.2.3. UCR paragraph 5.2.2.3 states: The switch shall provide a global default diversion of all unanswered calls above the ROUTINE precedence to a designated directory number (e.g., attendant console), after a specified period of time, selectable 15–45 seconds and before the voice mail and ACD system diversion. Calls above ROUTINE precedence destined to directory numbers that are configured with voice mail or ACD systems shall only divert as specified above. ROUTINE precedence calls destined to directory numbers that are configured with voice mail or ACD systems are allowed and shall be configurable to divert after the global default diversion timer interval.

4. Security. Security requirements in accordance with UCR, paragraph 5.2.12.8.2.4, are verified using the IA Test Plan. Results of the security testing are reported in a separate test report generated by the DISA IA test personnel, Reference (g).

5. Network Management (NM). In accordance with UCR, paragraph 5.2.12.8.2.5, the vendor is required to provide a management system to monitor the performance of the ASLAN portion of the VoIP system. This requirement was covered under a separate certification for the respective ASLANs listed on the UC APL. In accordance with the UCR, Section 5.3.8, the switching system NM requirements are not required for a PBX 1 and were not tested.

6. Synchronization. In accordance with UCR, paragraph 5.2.10.1.1.2, the SUT is required to derive timing with line timing mode and an internal clock of stratum 4 or better. The SUT met this requirement.

7. Latency. The UCR, paragraph 5.2.12.8.2.7, states that one-way system latency for the VoIP system must be 60 ms or less as averaged over any five-minute period. The latency requirement is measured from IP or Legacy (BRI, Digital, or Analog) handset to the egress trunk. The SUT one way latency measurements were conducted from each phone type supported by the SUT to include IPv4 and IPv6 traffic. All legacy handset to egress trunk one–way latency measurements ranged between 47 and 59 ms which meets this requirement. All dual stack IP End Instruments met VoIP latency requirements when IPv4 was preferred. Measured latency ranged between 42 ms and 58.62 ms with an average of 55.33 ms which meets this requirement. However, all dual stack IP End Instruments failed to meet VoIP latency requirements when IPv6 is preferred. Measured latency ranged between 63 ms to 100.61 ms with an average of 84.25 ms. This was adjudicated by DISA on 14 February 2012 as having a minor operational impact with the vendor's commitment to fix this anomaly by 9 August 2012.

8. Internet Protocol version 6 (IPv6). In accordance with UCR 2008 Change 2, Section 5.3.5, all systems submitted for testing must be IPv6 capable. Dual Stack solutions are preferred and tunneling solutions are unacceptable. All of the SUT components covered under this certification met this requirement with both testing and vendor's LoC.

9. In accordance with UCR, paragraph 5.2.12.8.2.9, the VoIP system (i.e., Media Gateway and Session Control Agent) shall meet the following requirements:

a. All components shall be capable of implementing Service Class tagging using the 8-bit Traffic Class in the IPv6 header and Differentiated Services Code Point (DSCP) field in the IPv4 header. The SUT met the requirement.

b. All session control components shall be capable of assigning DSCP (0-63) to any distinct service class for traffic that traverses the device in accordance with UCR, Table 5.3.1-3. The Traffic Class and DSCP values for media can be assigned to any value from 0-63. The SUT met the requirement.

c. For VoIP, video, and data end products, any end system that supports convergence must pre-assign the Virtual LAN (VLAN) using Institute of Electrical and Electronics Engineers (IEEE) 802.1Q tags prior to the frames entering the ASLAN in accordance with UCR, paragraph 5.3.1.7.4. For end-systems that support just one media, the LAN can assign the VLAN based on port-based VLAN assignment. The SUT was tested for voice only and is not certified for more than one media; therefore, this conditional requirement is not applicable to the SUT.

d. All end instruments shall be capable of implementing Service Class tagging using the 8-bit Traffic Class in the IPv6 header and DSCP field in the IPv4 header. The SUT end instruments that support IPv6 dual stack used class tagging

in the respective IP headers for IPv4 and IPv6, which meets the requirement. In addition the 9620 IP phone is IPv4 only and it met the DSCP tagging requirements for IPv4.

b. System Interoperability Results. The SUT is certified for joint use in the DISN as a PBX 1 and PBX 2 in accordance with the requirements set forth in References (c) and (d). The identified test discrepancies that remained open after software patches were applied and regression testing was completed have an overall minor operational impact. The SUT interoperability test summary is shown in Table 2-3. The SUT Interoperability Requirements/Status is shown in Table 2-4.

Table 2-3. SUT Interoperability Test Summary

DISN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs.
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT and is not required for a PBX 1.
DISN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog Loop Start (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs.
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all critical CRs and FRs.
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs.
VoIP (Ethernet IEEE 802.3u)	No	Certified	Met all critical CRs and FRs.
DISN Features and Capabilities			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Common Features	Yes	Certified	Met all critical CRs and FRs with the following minor exception: A short "ping" ring is not provided on the VoIP phone 9641when all calls are forwarded[1]
Attendant	No	Certified	Met all critical CRs and FRs.

Table 2-3. SUT Interoperability Test Summary (continued)

DISN Features and Capabilities				
Features and Capabilities		**Critical**	**Status**	**Remarks**
Public Safety		Yes	Certified	The SUT met all critical CRs and FRs for Basic 911.
Conferencing	Preset Conferencing	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
	Meet-Me Conferencing	No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
	Progressive Conferencing	No	Certified	Met all critical CRs and FRs
Nailed-up Connections		No	Not Tested	This feature is not supported by the SUT and is not required for a PBX 1.
DISN Hotline Services		No	Certified	Met all critical CRs and FRs.
MLPP		Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The SUT does not support the Loss of C2 announcement.[2]
Call Processing		Yes	Certified	Met all critical CRs and FRs.
ISDN Services		Yes	Certified	Met all critical CRs and FRs.
Synchronization		Yes	Certified	Met all critical CRs and FRs.
Reliability		Yes	Certified	Met all critical CRs and FRs.
Security		Yes	Certified	Met all critical CRs and FRs.[3]
VoIP System		No	Certified	Met all critical CRs and FRs with following minor exception: All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred.[4]
Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs.
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs.
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is supported by the SUT, but was not tested and is not covered under this certification.
	2-Wire Analog Ground Start (GR-506-CORE)	No	Certified	Met all critical CRs and FRs.[5]

NOTES:
1 A short "ping" ring is not provided on the VoIP phone 9641when all calls are forwarded and the phone does not visually display that call forward variable is enabled. This was adjudicated by DISA on 14 February 2012 as having a minor operational impact with the intent to change this requirement in the next UCR version from required to conditional for a VoIP end instrument.
2 The SUT does not support the Loss of C2 announcement. This announcement is invoked only when a DISN subscriber is automatically routed to a non-MLPP network. DISA previously adjudicated this anomaly as having a minor operational impact with the intent to change this requirement to conditional for a PBX 1 because this announcement would rarely be invoked on a PBX 1.
3 Security is tested by DISA-led Information Assurance test teams and the results published in a separate report, Reference (g).
4 All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred. This was adjudicated by DISA as minor with the vendor's POAM to fix this anomaly by 9 August 2012.
5 This interface requirement was met by the vendor's LoC.

Table 2-3. SUT Interoperability Test Summary (continued)

LEGEND:

ANSI	American National Standards Institute	LoC	Letters of Compliance
BRI	Basic Rate Interface	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
C2	Command and Control		
CAS	Channel Associated Signaling	MFR1	Multi-Frequency Recommendation 1
CR	Capability Requirements	MLPP	Multi-Level Precedence and Preemption
DISA	Defense Information Systems Agency	NI 1/2	National ISDN Standard 1 or 2
DISN	Defense Information System Network	PBX 1	Private Branch Exchange 1
DP	Dial Pulse	POAM	Plan of Actions and Milestones
DTMF	Dual Tone Multi-Frequency	PRI	Primary Rate Interface
E1	European Basic Multiplex Rate (2.048 Mbps)	Q.931	Signaling Standard for ISDN
FR	Feature Requirements	Q.955.3	ISDN Signaling standard for E1 MLPP
GR	Generic Requirement	SUT	System Under Test
GR-506-CORE	LSSGR: Signaling for Analog Interfaces	T1	Digital Transmission Link Level 1 (1.544 Mbps)
IEEE	Institute of Electrical and Electronics Engineers	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
IP	Internet Protocol		
IPv6	Internet Protocol version 6	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
ISDN	Integrated Services Digital Network	UC	Unified Capabilities
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	UCR	Unified Capabilities Requirements
		VoIP	Voice over Internet Protocol

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet). Information related to DISN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly through government civilian or uniformed military personnel from the Unified Capabilities Certification Office (UCCO), e-mail: ucco@disa.mil.

Table 2-4. SUT Interoperability Requirements/Status

DISN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 CAS (MFR1, DTMF, DP)	No	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Met	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Met	
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Met	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.1	Met	
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Met	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Met	
				Guard Timing (R)	UCR Section 5.2.4.3.6	Met	
				Satellite Timing (C)	UCR Section 5.2.4.3.7	Met	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Met	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested[1]	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Met	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Met	
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.2.4.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.2.4.4.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
				DISN Transmission Interface (R)	UCR Section 5.2.5	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Met	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Met	
				Supervisory Channel Associated Signaling (C)	UCR Section 5.2.6.1.2	Met	
				Clear Channel Capability (R)	UCR Section 5.2.6.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 5.2.6.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.1	Met	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Met	
				Normal Wink Start Operations (C)	UCR Section 5.2.4.3.3.1.1	Met	
				Glare Operation (C)	UCR Section 5.2.4.3.3.1.2	Met	
				Abnormal Wink Start (C)	UCR Section 5.2.4.3.3.2.1	Met	
				Glare Resolution (C)	UCR Section 5.2.4.3.3.2.2	Met	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Met	
				Guard Timing (R)	UCR Section 5.2.4.3.6	Met	
				Satellite Timing (C)	UCR Section 5.2.4.3.7	Met	
				Disconnect Control (C)	UCR Section 5.2.4.3.8	Met	
				Reselect and Retrial (C)	UCR Section 5.2.4.3.9	Not Tested[1]	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.4.3.10	Met	
				Dial-Pulse Signals (C)	UCR Section 5.2.4.4.1	Met	
				DTMF Signaling (C)	UCR Section 5.2.4.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.2.4.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.2.4.4.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
				DISN Transmission Interface (R)	UCR Section 5.2.5	Met	
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Met	
				National ISDN 1/2 Primary Access (R)	UCR Section 5.2.1.3.4.1	Met	
				ISDN ANSI MLPP Service Capability (R)	UCR Section 5.2.1.3.4.1.1	Met	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Met	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
				DISN ISDN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4.2	Met	
				Application (R)	UCR Section 5.2.4.7.1.1	Met	
				Physical Layer (R)	UCR Section 5.2.4.7.1.2	Met	
				Data Link Layer (R)	UCR Section 5.2.4.7.1.3	Met	
				Data Link Connection (R)	UCR Section 5.2.4.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.2.4.7.1.3.2	Met	
				Layer 3 DISN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4	Met	
				DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.2.4.7.1.4.2	Met	
				Sequence of Messages for DISN Circuit-Switched Calls (R)	UCR Section 5.2.4.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.2.4.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.2.4.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.2.4.7.1.4.6	Not Tested[1]	
				DISN Transmission Interface (R)	UCR Section 5.2.5	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 5.2.6.1	Met	
				Interface Characteristics (R)	UCR Section 5.2.6.1.1	Met	
				Clear Channel Capability (R)	UCR Section 5.2.6.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 5.2.6.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				64 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested[2]	Trunking	Direct Inward Dialing (C)	UCR Section 5.2.1.3.2	Not Tested	
				ITU-T ISDN Primary Access (C)	UCR Section 5.2.1.3.4.2	Not Tested	
				ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (C)	UCR Section 5.2.1.3.4.2.1	Not Tested	
				Trunk Group-Remove from Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Trunk Group-Restore to Service (C)	UCR Section 5.2.1.5.5	Not Tested	
				Call for Service Timing (R)	UCR Section 5.2.4.3.5	Not Tested	
				Disconnect Control (C)	UCR Section 5.2.3.4.8	Not Tested	
				Off-Hook Supervision Transition (C)	UCR Section 5.2.3.4.10	Not Tested	
				DISN ISDN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4.2	Not Tested	
				Application (R)	UCR Section 5.2.4.7.1.1	Not Tested	
				Physical Layer (R)	UCR Section 5.2.4.7.1.2	Not Tested	
				Data Link Layer (R)	UCR Section 5.2.4.7.1.3	Not Tested	
				Data Link Connection (R)	UCR Section 5.2.4.7.1.3.1	Not Tested	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.2.4.7.1.3.2	Not Tested	
				Layer 3 DISN User-to-Network Signaling (R)	UCR Section 5.2.4.7.1.4	Not Tested	
				DISN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.2.4.7.1.4.2	Not Tested	
				Sequence of Messages for DISN Circuit-Switched Calls (R)	UCR Section 5.2.4.7.1.4.3	Not Tested	
				Message Functional Definition and Content (R)	UCR Section 5.2.4.7.1.4.4	Not Tested	
				General Message Format and Information Elements Coding (R)	UCR Section 5.2.4.7.1.4.5	Not Tested	
				PCM-30 Digital Trunk Interface (C)	UCR Section 5.2.6.2	Not Tested	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 5.2.6.3	Not Tested	
				Integrated Digital Loop Carrier (C)	UCR Section 5.2.6.5	Not Tested	
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	
				Secure calls (R)	CJCSI 6215.01C	Not Tested	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	
				56 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				64 kbps switched data (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				NX56 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				NX64 synchronous BER (R: PRI only)	UCR Section 5.2.2.9.6	Not Tested	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Not Tested	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Line Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
2-Wire Loop Start Analog	Yes	Certified	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Met	
				PBX Line (C)	UCR Section 5.2.1.3.1	Met	
				Analog Line (R)	UCR Section 5.2.1.3.5	Met	
				Basic Line Test Capabilities (R)	UCR Section 5.2.1.5.4.1.1	Met	
				Advanced Line Test Capabilities (C)	UCR Section 5.2.1.5.4.1.1	Not Tested[1]	
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.4.2.1	Met	
				Reverse Battery (R)	UCR Section 5.2.4.3.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Met	
				National ISDN 1/2 Basic Access (C)	UCR Section 5.2.1.3.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
				S/T Reference Point (R)	UCR Section 5.2.4.7.1.2.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: BRI only)	FTR 1080B-2002	Met	
2-Wire Proprietary Digital	No	Certified	Access	Directory Number Identification (R)	UCR Section 5.2.1.1.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.2.4.5.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Common Features	Yes	Certified	Individual Lines (R)	UCR Section 5.2.1.1.1	Met	
			Denied originating service (C)	UCR Section 5.2.1.1.3	Not Tested[1]	
			Code restriction and diversion (C)	UCR Section 5.2.1.1.4	Met	
			Call waiting (R)	UCR Section 5.2.1.1.5.1	Met	
			Three-way calling (R)	UCR Section 5.2.1.1.6	Met	
			Add-on transfer, conference calling, and call hold (C)	UCR Section 5.2.1.1.7	Met	
			Call Transfer Individual – All calls (R)	UCR Section 5.2.1.1.7.1	Met	
			Call Transfer - Internal Only (R)	UCR Section 5.2.1.1.7.2	Met	
			Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R)	UCR Section 5.2.1.1.7.3	Met	
			Call Transfer – Outside (R)	UCR Section 5.2.1.1.7.4	Met	
			Call Transfer – Add-On Restricted Station (C)	UCR Section 5.2.1.1.7.5	Met	
			Call Transfer – Attendant (C)	UCR Section 5.2.1.1.7.6	Met	
			Call Hold (R)	UCR Section 5.2.1.1.7.7	Met	
			Conference Calling – Six Way Station Controlled (C)	UCR Section 5.2.1.1.7.8	Not Tested[1]	
			Call Forwarding Variable (R)	UCR Section 5.2.1.1.8.1	Met	
			Call Forward Busy Line (R)	UCR Section 5.2.1.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (R)	UCR Section 5.2.1.1.8.3	Met	
			Selective Call Forwarding (C)	UCR Section 5.2.1.1.8.4	Not Tested[1]	
			Call pick-up (C)	UCR Section 5.2.1.1.9.1	Met	
			Address Translation (C)	UCR Section 5.2.1.7	Met	
			Assured Dial Tone (R)	UCR Section 5.2.1.9	Met	
Attendant	No	Not Tested	Attendant Features (C)	UCR Section 5.2.1.2.2	Not Tested[1]	
Public Safety	Yes	Certified	Emergency Service Basic (911) Caller (R)	UCR Section 5.2.1.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Service (C)	UCR Section 5.2.1.4.1.2	Not Tested[1]	
			Enhanced Emergency Service (E911) (C)	UCR Section 5.2.1.4.1.3	Not Tested[1]	
			Trace of terminating calls (C)	UCR Section 5.2.1.4.2	Met	
			Outgoing call trace (C)	UCR Section 5.2.1.4.3	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Conferencing	No	Not Tested	Preset Conferencing (C)	UCR Section 5.2.1.6	Not Tested[1]	
			Meet-Me Conferencing (C)	UCR Section 5.2.1.6.2	Not Tested[1]	
			Progressive Conferencing (C)	UCR Section 5.2.1.6.3	Met	
Nailed-up Connections	No	Not Tested	Nailed-Up Connections (C)	UCR Section 5.2.1.8	Not Tested[1]	
DISN Hotline Services	No	Certified	DISN Analog Hotline Service (C)	UCR Section 5.2.1.12	Met	
MLPP	Yes	Certified	MLPP Overview (R)	UCR Section 5.2.2.1.1	Met	
			Preemption in the Network (R)	UCR Section 5.2.2.2	Met	
			Network Facility with Lower Precedence Calls (R)	UCR Section 5.2.2.2.1	Met	
			Network Facility with Equal or Higher Precedence Calls (R)	UCR Section 5.2.2.2.2	Met	
			Precedence Call Diversion (R)	UCR Section 5.2.2.3	Met	.
			Channel Associated Signaling (C)	UCR Section 5.2.2.4.1	Met	
			Primary Rate Interface (R)	UCR Section 5.2.2.4.2	Met	
			Analog Line MLPP (R)	UCR Section 5.2.2.5	Met	
			ISDN MLPP Basic Rate Interface (C)	UCR Section 5.2.2.6	Met	
			ISDN Primary Rate Interface (R)	UCR Section 5.2.2.7	Met	
			Precedence Call Waiting (R)	UCR Section 5.2.2.8.1	Met[3]	
			Call Forwarding (R)	UCR Section 5.2.2.8.2	Partially Met[4]	
			Call Transfer (R)	UCR Section 5.2.2.8.3	Met	
			Call Hold (R)	UCR Section 5.2.2.8.4	Met	
			Three-Way Calling (R)	UCR Section 5.2.2.8.5	Met	
			Call Pickup (C)	UCR Section 5.2.2.8.6	Met	
			Conferencing (C)	UCR Section 5.2.2.8.7.1	Met	
			Multiline Hunt Group (C)	UCR Section 5.2.2.8.8	Met	
			Community of Interest (C)	UCR Section 5.2.2.8.9	Not Tested[1]	
			MLPP Interaction with EKTS features (C)	UCR Section 5.2.2.10.1	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Call Processing	Yes	Certified	Call Treatments (R)	UCR Section 5.2.3.1	Met	
			Primary and Alternate Routing (C)	UCR Section 5.2.3.2	Met	
			E&M Lead Signaling States (C)	UCR Section 5.2.3.3.1	Not Tested[2]	
			4-Wire Analog User Access Lines (C)	UCR Section 5.2.3.3.2	Not Tested[2]	
			2-Wire User Access Lines (R)	UCR Section 5.2.3.3.3	Met	
			Termination of Analog Lines (R)	UCR Section 5.2.3.3.4	Met	
			DISN User Dialing (R)	UCR Section 5.2.3.5.1.1	Met	
			Interswitch and Intraswitch Dialing (R)	UCR Section 5.2.3.5.1.1	Met	
			Seven-Digit Dialing (R)	UCR Section 5.3.3.5.2.1	Met	
			Ten-Digit Dialing (R)	UCR Section 5.2.3.5.2.2	Met	
			Access Code (R)	UCR Section 5.2.3.5.1.3	Met	
			Access Digit (R)	UCR Section 5.2.3.5.1.3.1	Met	
			Precedence Digit (R)	UCR Section 5.2.3.5.1.3.2	Met	
			Service Digit (R)	UCR Section 5.2.3.5.1.3.3	Met	
			Route Code (R)	UCR Section 5.2.3.5.1.4	Met	
			Area Code (R)	UCR Section 5.2.3.5.1.5	Met	
			Switch Code (R)	UCR Section 5.2.3.5.1.6	Met	
			Line Number (R)	UCR Section 5.2.3.5.1.7	Met	
			Calling Name Delivery (C)	UCR Section 5.2.3.5.1.8.1	Not Tested[1]	
			Calling Number Delivery (R)	UCR Section 5.2.3.5.1.8.2	Met	
			Emergency Service 911 Conflict Resolution (R)	UCR Section 5.2.3.5.1.9	Met	
			DISN Switch Outpulsing Digit Formats (C)	UCR Section 5.2.3.5.2	Met	
			Standard Directory Number (R)	UCR Section 5.2.3.5.3	Met	
			Standard Test Numbers (C)	UCR Section 5.2.3.5.4	Not Tested[1]	
			Base Services – Abbreviated Numbers (C)	UCR Section 5.2.3.5.5	Met	
			Digit Reception Requirements (R)	UCR Section 5.2.3.5.6	Met	
			Screening (C)	UCR Section 5.2.3.5.8	Met	
ISDN Services	Yes	Certified	BRI Access, Call Control and Signaling (C)	UCR Section 5.2.9.2, Table 5.2.9-1	Met	
			Uniform Interface Configuration for BRIs (C)	UCR Section 5.2.9.2, Table 5.2.9-2	Met	
			Electronic Key Telephone Systems (EKTS) (C)	UCR Section 5.2.9.2, Table 5.2.9-3	Met	
			PRI Access, Call Control and Signaling (R)	UCR Section 5.2.9.2, Table 5.2.9-4	Met	
			PRI Features (R)	UCR Section 5.2.9.2, Table 5.2.9-5	Met	
			Packet Data Features and Capabilities (C)	UCR Section 5.2.9.2, Table 5.2.9-6	Not Tested[1]	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DISN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Synchroniz-ation	Yes	Certified	Line timing mode (R)	UCR Section 5.2.11.2	Met	
			Internal Stratum 4 (R)	UCR Section 5.2.10.1.1.2.2	Met	
			Synchronization Performance Monitoring Criteria (C)	UCR Section 5.2.10.2	Not Tested[1]	
			DS1 Traffic Interfaces (C)	UCR Section 5.2.10.3	Not Tested[1]	
			DS0 Traffic Interconnects (C)	UCR Section 5.2.10.4	Not Tested[1]	
Reliability	Yes	Certified	System Availability (R)	UCR Section 5.2.11.2	Met	
			Backup Power (R)	UCR Section 5.2.11.3	Not Tested[5]	
			Power Components (R)	UCR Section 5.2.11.3.1	Not Tested[5]	
			UPS Requirements (R)	UCR Section 5.2.11.3.2	Not Tested[5]	
			UPS PBX 1 Load Capacity (R)	UCR Section 5.2.11.3.2.1	Not Tested[5]	
			Backup Power (Environmental) (R)	UCR Section 5.2.11.3.3	Not Tested[5]	
			Alarms (R)	UCR Section 5.2.11.3.4	Not Tested[4]	
Security	Yes	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 3	Met[6]	
VoIP						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
VoIP System	No	Certified[7]	Voice Quality with MOS of 4.0 or better (R)	UCR Section 5.2.12.8.2.1	Met	
			ITU-T G.711 PCM CODEC (R)	UCR Section 5.2.12.8.2.2	Met	
			MLPP (R)	UCR Section 5.2.12.8.2.3	Met	
			Security (R)	UCR Section 5.2.12.8.2.4	Met	
			Network management (C)	UCR Section 5.2.12.8.2.5	Met	
			System timing (R)	UCR Section 5.2.12.8.2.6	Met	
			Latency ≤ 60 milliseconds (R)	UCR Section 5.2.12.8.2.7	Partially Met[8]	
			IPv6 capable (R)	UCR Section 5.2.12.8.2.8	Met	
			Service Class Tagging (R)	UCR Section 5.2.12.8.2.9	Met	
			Softphone Requirements (C)	UCR 2008, Change 1, Section 5.3.2.6.1.7	Not Tested[1]	

Table 2-4. SUT Interoperability Requirements/Status (continued)

Network Gateways							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
PSTN[9]	No	Certified	Trunking	Positive Identification Control (C)	CJCSI 6215.01C	Met	
				On-Netting (C)	CJCSI 6215.01C	Met	
				Off-Netting (C)	CJCSI 6215.01C	Met	
				Ground Start Line (R)	UCR Section 5.2.2	Met[10]	
				Immediate Start (C)	UCR Section 5.3.2	Met	
				Delay Dial (C)	UCR Section 5.3.4	Met	

NOTES:
1 This feature/capability is not supported by the SUT. This is not a required feature for a PBX 1.
2 This interface is not offered by the SUT and is not required for a PBX 1.
3 This requirement requires that the SUT provide a global diversion for all unanswered precedence calls above ROUTINE after a specified diversion timer expires (15-45 seconds). Conditionally the SUT shall support precedence call diversion of precedence above ROUTINE calls placed to an ACD. The SUT includes an internal ACD, which also met this requirement.
4 A short "ping" ring is not provided on the 9641VoIP phone when all calls are forwarded and the phone does not visually display that call forward variable is enabled. This was adjudicated by DISA on 14 February 2012 and changed to a conditional requirement in the UCR.
5 This requirement is a non-testable requirement. It is the responsibility of the respective base/post/camp/station communications agency to provide this with the SUT when installed.
6 Security is tested by DISA-led Information Assurance test teams and the results published in a separate report, Reference (g).
7 The SUT is certified for VoIP with any certified ASLAN or ASLAN components posted on the UC APL.
8 All Dual Stack IP End Instruments fail to meet VoIP System Latency requirements when IPv6 is Preferred. This was adjudicated by DISA as minor with the vendor's POAM to fix this anomaly by 9 August 2012.
9 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DISN with the exception of MLPP.
10 This interface requirement was met by the vendor's LoC.

Table 2-4. SUT Interoperability Requirements/Status (continued)

LEGEND:

ACD	Automatic Call Distribution	FTR	Federal Telecommunications Recommendation	PBX 1	Private Branch Exchange 1
ANSI	American National Standards Institute	FTR 1080B	Video Teleconferencing Services	PCM	Pulse Code Modulation
APL	Approved Products List	G.711	PCM of voice frequencies	PCM-24	Pulse Code Modulation - 24 Channels
ASLAN	Assured Services Local Area Network	GR	Generic Requirement	PCM-30	Pulse Code Modulation - 30 Channels
BER	Bit Error Ratio	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface
BRI	Basic Rate Interface			PSTN	Public Switched Telephone Network
C	Conditional	H.320	Standard for Narrowband VTC	Q.955.3	ISDN Signaling Standard for E1 MLPP
CAS	Channel Associated Signaling	IP	Internet Protocol	R	Required
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IPv4	Internet Protocol version 4	S/T	ISDN BRI 4-wire interface
		IPv6	Internet Protocol version 6	SS7	Signaling System 7
CODEC	Coder/Decoder	ISDN	Integrated Services Digital Network	STE	Secure Terminal Equipment
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	STIGs	Security Technical Implementation Guides
		ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	STU-III	Secure Telephone Unit -3rd generation
DISA	Defense Information Systems Agency			SUT	System Under Test
DISN	Defense Information System Network	kbps	kilobits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DISR	DoD IT Standards Registry	Mbps	Megabits per second	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DoD	Department of Defense	MFR1	Multi-Frequency Recommendation 1		
DoDI	Department of Defense Instruction	MLPP	Multi-Level Precedence and Preemption	T.4	Standardization of Group 3 facsimile terminals for document transmission
DP	Dial Pulse	MOS	Mean Opinion Score		
DS0	Digital Signal Level 0 (64 kbps)	NFAS	Non Facility Associated Signaling	UC	Unified Capabilities
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	NI 1/2	National ISDN Standard 1 or 2	UCR	Unified Capabilities Requirements
		NI2	National ISDN Standard 2	UPS	Uninterruptible Power Supply
DTMF	Dual Tone Multi-Frequency	NX56	Data format restricted to multiples of 56 kbps	VBD	Variable bit data
E&M	Ear and Mouth	NX64	Data format restricted to multiples of 64 kbps	VoIP	Voice over Internet Protocol
E1	European Basic Multiplex Rate (2.048 Mbps)	PBX	Private Branch Exchange	VTC	Video Teleconferencing
EKTS	Electronic Key Telephone System				